TEST EQUIPMENT LAB.

Babcock

BRE REPORT NO. 369

HANDBOOK

SERVICE INSTRUCTIONS

for

BSG-10 SIGNAL GENERATOR

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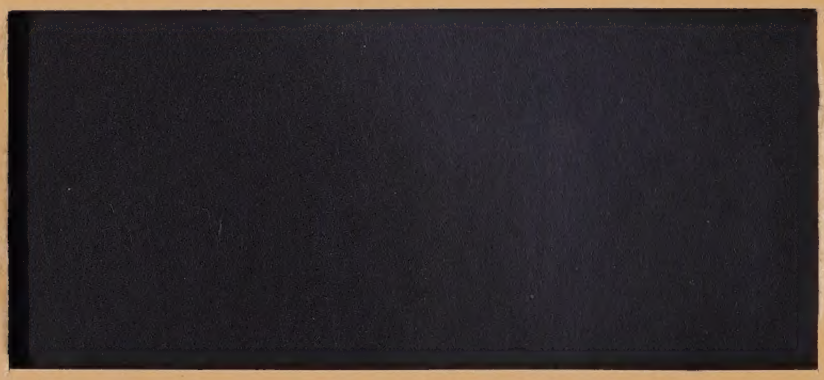
BABCOCK RADIO ENGINEERING, INC.

1640 MONROVIA AVE. • P.O. BOX 344 • COSTA MESA, CALIF.



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BSG-10 SIGNAL GENERATOR

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1.0 INTRODUCTION

1.1 This publication is issued as the basic Service Instruction Handbook for the BSG-10 Signal Generator. The unit is manufactured by Babcock Radio Engineering, Inc., 1640 Monrovia Avenue, Costa Mesa, California.

1.2 This handbook contains descriptive data and instructions for operation, inspection and maintenance of subject equipment. Detailed information regarding theory of operation, operational procedures and required service equipment is also included.

2.0 General Purpose of Equipment

2.1 The Signal Generator is primarily designed as a test generator for F.M. receivers in the range of 406 - 420 megacycles, using carrier deviations up to ± 300 kilocycles. The Signal Generator is a rack mounted instrument providing frequency modulated R.F. carrier signals of accurately known frequency and amplitude.

2.2 Description of Signal Generator

2.2.1 The Signal Generator consists of a R.F. Section. The unit is housed in a ruggedized metal container and is designed for rack mounting.

2.3 Characteristics - General Physical

R. F. Section

Width 19 Inches

Height 10.5 Inches

Length 17 Inches

Weight 65 Pounds

2.4 Characteristics - Signal Generator - R. F. Section

Range	- 406-420 megacycles in one megacycle increments (positions "1" through "15")
Accuracy	- Crystal controlled to ± 0.01 per cent
Amplitude	- (1) Continuously variable from one to 100,000 microvolts

(2) Fixed level output in excess of 1,000 microvolts across a 50 ohm load.

Output Impedance - 52 ohms

2.4.1 External Modulation

Range - Any frequency between .5 Kc and 80 Kc.

Amplitude - Any signal having a minimum amplitude of 1.5 RMS is sufficient to frequency modulate the R.F. carrier ± 300 kilocycles.

Input Impedance - 500 ohms

Power Requirements - 115 volts AC ± 10%, 50 to 65 cps

2.5 List of Special Test Equipment

2.5.1 All items of special test equipment required to service and maintain the Signal Generator are tabulated in Table II.

2.6 List of Special Tools

2.6.1 No special tools are required for service and maintenance of the Signal Generator. However, common hand tools such as screwdrivers of the proper size, Allen wrenches, needle nose pliers, diagonal cutters, soldering irons, etc., should be available to properly service the unit.

3.0 General Inspection

3.1 Inspection

3.1.1 Since the Signal Generator is a ruggedly designed unit which will withstand normal vibration and shock, no involved procedures are required to prepare the unit for immediate use. However, the entire Test Unit should be inspected for physical damage which could have occurred during transit. All recommended inspection procedures are outlined in paragraph 3.1. The Signal Generator should be tested for proper operation as outlined in paragraph 5.0.

3.1.2 Proceed as follows to inspect the units when received for use.

3.1.2.1 Remove the unit from the packaging.

3.1.2.2 Inspect the unit for obvious physical damage or evidence of wear and deterioration. Pay particular attention to connector plugs and connector receptacles. Inspect such items for bent and broken pins, or for an accumulation of dirt, dust or corrosion.

3.1.2.3 Inspect the panel for broken meters, knobs and switches. Notice

that the fuse caps and fuses are installed and are of the proper size.

3.1.2.4 Remove the screws holding the top and bottom covers. Visually inspect the interior of the unit for signs of damage to parts. Pay particular attention to electron tubes.

3.1.2.5 It is recommended that the electron tubes be removed and checked on a suitable tube tester such as tabulated in Table II. Substandard tubes must be discarded, and replaced with electron tubes known to be in good operating condition. Replace good tubes in the same sockets from which they were removed. If any of the electron tubes require replacement, it may be necessary to adjust the associated circuits. This can be determined by following the test procedure as outlined in paragraph 5.0

3.1.2.6 Perform a visual check of unit wiring for signs of damaged, frayed, loose or burned wires. Check for tightness of mounting hardware and for corrosion of wiring terminals. Check that all electron tubes are provided with shields and that the shields are properly secured.

3.2 Testing

3.2.1 Upon completion of the visual inspection, submit the units to the minimum performances standards check outlined under paragraph 5.0. This will insure that the unit is operating properly and is ready for use. If the unit fails to perform as outlined in the minimum performance standards, submit it to maintenance procedures as required. If the unit meets all requirements of the minimum performance standards, check that mating surfaces of covers and chassis are clean, then secure the covers with the screws provided. Make sure that the attaching screws are tightened sufficiently to insure a good seal.

4.0 System Operation - Signal Generator - R.F. Section

4.1 General

4.1.1 The Signal Generator, R.F. Section, consists essentially of two R.F. subassemblies, a deviation control section, a deviation metering section, an A.F. modulation section and a power supply section. Basic operational principles of these sections are as follows.

4.1.2 Output R.F. Subassembly

4.1.2.1 Electron tube V-301 functions as a crystal oscillator and produces an output frequency dependent upon the selection of crystals. Any one of 15 crystals can be selected by positioning the FREQUENCY knob. The signal from V-301 is applied to V-302 where it is quadrupled in frequency. The signal from V-302 is combined with the signal from the exciter R.F. section in mixer stage V-303. Electron tube V-304 amplifies the difference frequency signal from V-303 and delivers its output to V-305 where the frequency is tripled. Final tripler stage V-306 is driven by V-305 and delivers its output to either the attenuation control AT-301 or the fixed

output jack J-102. The R.F. output from AT-301 is applied to the R.F. OUTPUT receptacle J-101 through a 52 ohm impedance network and to the R.F. OUTPUT meter through a crystal rectifier and meter calibration circuit.

4.1.3 Exciter R.F. Subassembly

4.1.3.1 Electron tube V-201 functions as a crystal oscillator and delivers a signal to V-203. Electron tube V-202 is placed across the tank circuit and functions as a reactance modulator to phase modulate the signal from V-201. Modulation signals from the deviation control section are impressed upon the cathode of V-202. The signal from V-201 is successively multiplied in frequency by each of the stages containing electron tubes V-203, V-204, V-205, V-206, V-207 and V-208. The 150 megacycle output from V-208 is applied through J-202 and an internal coaxial cable through J-302 to mixer stage V-303 in output R.F. section.

4.1.4 Deviation Control Section

4.1.4.1 The external modulation signals from the Coder are applied across DEVIATION potentiometer R-109. The output from R-109 is applied to the input grid of V-106 through control R-126. The output from V-106 is applied to V-107 where it is amplified and applied to the cathode of reactance modulator V-202 in the exciter R.F. section.

4.1.5 Deviation Metering Section

4.1.5.1 The external modulation signals from the Coder Section are applied to the deviation control section and are also applied to V-104 through control R-110. The output from V-104 is applied to V-105 where it is amplified and delivered to the DEVIATION Meter through a rectifier and resistor bridge circuit.

4.1.6 Power Supply Section

4.1.6.1 Primary 115 volts AC power is applied through receptacle J-105 and fuse F-101 to the POWER switch. When the POWER switch is OFF, power is applied to internal heaters which serve to maintain components at a stable operating temperature. When the POWER switch is ON, power is applied to the primary of transformer T-101 which is provided with four secondary windings. One secondary winding supplies 28 volts AC which is provided but not used in this generator. Another secondary winding supplies 6.3 volts AC power to the generator electron tube heaters. A third winding supplies 5 volts AC to rectifier V-101. The high potential AC secondary winding is center-tapped and supplies the plates of V-101. When the CARRIER switch is ON, the center-tap ground return is completed and V-101 functions to rectify the high potential AC. The rectified B+ potential that appears on the cathode of V-101 is filtered and then distributed to various generator electron tubes. Electron tubes V-102 and V-103 together with their associated dropping resistors provide sources of regulated DC for the crystal oscillators and

reactance modulator which would otherwise be affected by line voltage variations.

5.0 Minimum Performance Standards

5.1 Included in paragraphs 5.2 through 5.6 are minimum performance standards checks which are to be employed when checking the subject equipment for proper operation. The unit can be considered as functioning satisfactorily and ready for use if it performs as outlined.

5.2 Measurement of R.F. Output Frequencies - R.F. Section

5.2.1 Proceed as follows to measure R.F. Output frequencies of the signal generator:

5.2.1.1 Place the generator on a suitable work bench.

5.2.1.2 Connect a power cable to receptacle J-105 and to a source of 115 volts AC, 50 to 1000 cycles power. The receptacle J-105 is accessible from the back of the generator and is located at the lower corner.

5.2.1.3 Position the POWER switch to ON and note that the POWER pilot lamp illuminates. This indicates that all electron tube heaters have been energized.

5.2.1.4 After a warm-up period of approximately five minutes, position the CARRIER switch to ON and note that the CARRIER lamp illuminates. This indicates that B+ power is available to all electron tubes.

5.2.1.5 Rotate the FREQUENCY knob until "1" (406 mc) is directly below the MC index marker. Place local R.F. Output selector in the attenuated position.

5.2.1.6 Rotate the attenuator dial clockwise until an indication is obtained on the R.F. OUTPUT meter.

5.2.1.7 Rotate the OUTPUT TUNING knob as necessary to obtain a peak indication on the R.F. OUTPUT meter.

5.2.1.8 Rotate the inner carrier output dial until the R.F. OUTPUT meter needle is aligned with the red SET 100K index mark.

5.2.1.9 Adjust the fiducial ring of the carrier output dial until its index mark is aligned with the inner carrier output dial 100K (100,000 microvolts) mark.

5.2.1.10 Connect a frequency meter to the R.F. OUTPUT receptacle J-101. Rotate the attenuator dial as necessary to obtain an indication on the frequency meter. Operate frequency meter controls as necessary to measure frequency of the R.F. Output from J-101.

5.2.1.11 With the FREQUENCY knob adjusted at "1" (406 mc) megacycles, the indicated frequency must be within the limits of 405.9594 to 406.0406 megacycles

5.2.1.12 Repeat steps 5.2.1.5 through 5.2.1.11 of this paragraph, checking each frequency position "1" (406 mc) to "15" (420 mc). The high limit and low limit tolerances for each of the 15 RF frequencies are tabulated in Table V. The frequencies indicated on the frequency meter must be within the specified tolerances.

5.2.1.13 The R.F. carrier frequency can be shifted a limited amount by adjusting capacitor C-249 which is accessible from the bottom of the generator by removing the cover button which is adjacent to heater resistor R103. An adjustment of C-249 will shift all of the R.F. carrier frequencies by the same amount.

5.3 Measurement of R.F. Output Level

5.3.1 Proceed as follows to check R.F. output level of the Signal Generator.

5.3.1.1 Repeat steps 5.2.1.1 through 5.2.1.9 of paragraph 5.2.

5.3.1.2 Connect a VTVM to the R.F. OUTPUT receptacle J-101. Rotate the attenuator dial to 100,000 microvolts. Operate the VTVM controls as necessary to measure the R.F. output level from J-101.

5.3.1.3 With the attenuator dial positioned to 100,000 microvolts, the indicated level must be 100,000 microvolts, + 1DB, as noted in Table VI.

5.4 Deviation Linearity Check

5.4.1 Follow steps 6.4.1 - 6.4.14 under paragraph 6.4.

5.4.2 Adjust audio oscillator to frequencies as noted in Table III maintaining 1.5 volts AC (RMS) at J-103. Observe correct number of disappearances as noted in Table III. The proper number of disappearances must occur as deviation control is rotated clockwise to the + 300 Kc. red line on the deviation meter.

5.5 R.F. Output Meter Calibration Check

5.5.1 Follow steps 6.5.1 - 6.5.3 under paragraph 6.5.

6.0 Maintenance

Included in this section are detailed test and maintenance procedures required to localize defects and to effect the necessary repairs of an inoperative Signal Generator. It is assumed that the maintenance specialists have been thoroughly trained in electronic maintenance practices and that they have had previous experience in performance testing, alighment and adjustment procedures on similar types of equipment. It is further assumed that the maintenance personnel are thoroughly familiar with the physical characteristics, the operational characteristics and the capabilities and limitations

of the subject equipment and that they have a basic understanding of the operational theory. Such information is contained in Section I through Section IV of this publication, and it is recommended that maintenance personnel study this information before attempting any maintenance procedures.

Table I contains a test point voltage diagram which can be employed to localize defective circuit components within any stage or circuit of the unit. Field Maintenance personnel can localize trouble, replace defective components and perform certain adjustments. However, if the R.F. output or R.F. exciter subassemblies required alignment, as evidenced during trouble shooting or minimum performance standards check, such alignment should be performed at overhaul facilities where adequate test equipment and trained personnel are available.

6.1 Testing and Alignment

6.2 Testing and Alignment of Exciter Sub-Chassis

6.2.1 Connect J-105 to an 115 volt AC 50-65 cycle power source. Turn to ON the power switch and allow a five minute warmup period.

6.2.2 Connect a VTVM to TP-201. Adjust VTVM to measure negative DC voltage. Turn carrier switch to ON.

6.2.3 Adjust capacitors C-208, C-212, C-213, inductance L-204, capacitors C-219, C-220, inductance L-206 and capacitor C-224 (in that order) until maximum indication is obtained on the VTVM connected to TP-201.

Note: Readjusting C-208, C-212 and C-213 will necessitate realignment of the deviation linearity.

6.2.4 Move the VTVM to TP-202. Adjust inductance L-208 and capacitor C-228 (in that order) until maximum indication is obtained on the VTVM connected to TP-202.

6.2.5 Move the VTVM to test point TP-203. Adjust capacitors C-231 and C-233 (in that order) until maximum indication is obtained on the VTVM connected to TP-203.

6.2.6 Move the VTVM to TP-204. Adjust capacitors C-234 and C-236 (in that order) until maximum indication is obtained on the VTVM connected to TP-204.

6.2.7 Connect the VTVM to TP-303 on the R.F. Strip. Adjust C-237 until maximum indication is obtained on the VTVM connected to TP-303.

6.3 Testing and Alignment of R.F. Sub-Chassis

6.3.1 Connect J-105 to an 115 volt AC 50-1000 cycle power source. Turn power switch to ON and allow a five minute warmup period.

6.3.2 Connect a VTVM to test point TP-301. Adjust the VTVM to measure negative DC voltage. Turn the carrier switch to ON.

6.3.3 Rotate the frequency selector to position "8" (413 mc).

6.3.4 Rotate the adjustment slug of inductance L-301 full counter-clockwise (minimum inductance). Adjust L-302 until maximum indication is obtained on the VTVM connected to TP-301. If no indication is readily obtained at TP-301, increase the inductance of L-301 (rotate adjustment slug clockwise). If no VTVM indication is obtained after adjustments of L-301, the corresponding crystal is probably defective and should be replaced.

6.3.5 With VTVM on TP-301 adjust C-309 for maximum indication.

6.3.6 Move the VTVM to test point TP-302. Adjust inductance L-304 and capacitor C-311 (in that order) until maximum indication is obtained on the VTVM connected to TP-302.

6.3.7 Move the VTVM to test point TP-303. Adjust capacitor C-312, inductance L-307, capacitor C-317 and C-237 on the exciter sub-chassis (in that order) until maximum indication is obtained on the VTVM connected to TP-303.

6.3.8 Move the VTVM to test point TP-304. Adjust capacitors C-318 and C-321 (in that order) until maximum indication is obtained on the VTVM connected to TP-304. By the time Step 6.3.7 is completed, the relay K-301 should have restored full plate voltage to all tubes.

6.3.9 Rotate frequency selector and observe voltage at position "1" (406 mc) and position "15" (420 mc). Adjust C-321 to obtain equal voltage at TP-304 at both frequencies. Return frequency selector to position "8" (413 mc).

6.3.10 Move the VTVM to test point TP-305. With the frequency selector set at position "8" (413 mc), adjust capacitors C-322 and C-323 (in that order) until maximum indication is obtained on the VTVM connected to TP-305.

6.3.11 Connect the VTVM to test point TP-301. Rotate the frequency selector switch S-301 to each of its 15 positions and observe the VTVM. If crystal oscillator V-301 drops out of oscillation at any one of the positions, quickly adjust inductance L-302 to restore oscillation. Slight adjustment of inductance L-301 can also be accomplished to restore oscillation. If either inductance must be seriously detuned from the previously established point for any particular position of S-301, the corresponding crystal is probably defective and should be replaced.

CAUTION!

Do not apply plate power to the R.F. chassis electron tubes unless the R.F. signal from the exciter chassis is available at receptacle J-302. Loss of this signal will also cause a loss of bias which could result in

damage. When alignment of the R.F. chassis is accomplished using the generator power supply with P-303 connected, automatic protection due to loss of drive is provided by the operation of relay K-301 which lowers the plate voltage to the R.F. chassis from approximately 250 volts DC to approximately 170 volts DC. All test point voltages are listed on Table I.

6.3.12 Rotate frequency selector to position "8" (413 mc).and observe the R.F. output meter. Adjust output tuning control on front panel for maximum output. Adjust C-121 for a maximum reading and then readjust output tuning control for maximum reading.

6.3.13 Rotate frequency selector to position "1" (406 mc) and note R.F. output reading.

6.3.14 Rotate frequency selector to position "15" (420 mc) and note R.F. output reading.

6.3.15 Adjust C-323 for equal R.F. readings on R.F. output meter while checking frequency position "1" (406 mc) and "15" (420 mc).

6.4 Alignment of Frequency Deviation Linearity

6.4.1 Connect the power cable to receptacle J-105 and to a source of 115 volts AC, 50-1000 cycle power.

6.4.2 Position the power switch to ON, noting that the POWER pilot lamp illuminates.

6.4.3 After a warmup period of approximately five minutes, position the carrier switch to ON and note that the carrier lamp illuminates.

6.4.4 Rotate the frequency knob until position "1" (406 mc) is directly below the megacycle index marker.

6.4.5 Rotate the attenuator dial clockwise until an indication is obtained on the R.F. Output meter.

6.4.6 Rotate the Output Tuning knob as necessary to obtain a peak indication on the R.F. Output Meter.

6.4.7 Rotate the attenuator dial until the R.F. Output meter needle is aligned with the red, 100,000 microvolts, set mark.

6.4.8 Adjust the fiducial ring of the carrier output dial until its index mark is aligned with the inner carrier output dial 100,000 microvolts mark. Rotate the attenuator dial to zero.

6.4.9 Connect the R.F. receptacle J-101 to the input of the test receiver. Connect the receiver "pan" output to a panoramic adapter.

6.4.10 Tune the receiver to the R.F. carrier output frequency of the

generator, as selected by the frequency knob. Adjust the attenuator dial and controls, on the receiver and panoramic adapter, as necessary until a single unmodulated signal is observed at the center of the panoramic adapter screen.

6.4.11 Connect audio oscillator to J-103. Adjust oscillator frequency to 7500 cycles.

6.4.12 Connect VTVM to J-103.

6.4.13 Rotate DEVIATION control fully clockwise.

6.4.14 Adjust level control on audio oscillator until 1.5 volts AC (RMS) appears at J-103.

6.4.15 Adjust R-110 for full scale deflection on deviation meter with deviation control fully clockwise.

6.4.16 Place AC VTVM lead on Pin 1 of V-106.

6.4.17 Adjust R-126 for approximately 0.1 V AC (RMS) with DEVIATION control turned fully clockwise. Remove VTVM from Pin 1. Place VTVM on J-103.

6.4.18 Adjust audio oscillator frequency to 78,288 cycles. With DEVIATION control fully clockwise, adjust audio oscillator output control until VTVM reads 1.5 volts AC (RMS) at J-103.

6.4.19 Adjust DEVIATION control until needle on deviation meter is at ± 300 Kc.(red line).

6.4.20 Adjust C-208, C-212, C-213 on exciter strip for maximum modulation as viewed on the panadapter, maintaining balance (as noted by screw slots) between C-202 and C-213.

6.4.21 Adjust R-126 to obtain 1-1/2 carrier disappearances as noted on panoramic adapter.

6.4.22 Place VTVM on J-103.

6.4.23 Adjust audio oscillator frequency to 13,700 cycles, 1.5 volts AC (RMS) as noted at J-103. Maintain deviation meter at ± 300 Kc. red line with DEVIATION control.

6.4.24 Adjust R-126 to obtain 7-1/8 carrier disappearances as noted on panoramic adapter.

6.4.25 Adjust audio oscillator frequency to 78,288 cycles maintaining 1.5 volts AC (RMS) at J-103, maintaining deviation meter at ± 300 Kc. red line.

6.4.26 Adjust C-212, C-213 for 1-1/2 carrier disappearances as noted

on panoramic adapter. Maintain a balanced condition on C-212 and C-213 as noted by screwdriver slot.

6.4.27 Repeat step 6.4.23.

6.4.28 Repeat step 6.4.24.

6.4.29 Repeat step 6.4.24.

6.4.30 Repeat step 6.4.26.

6.4.31 Adjust audio oscillator to frequencies as noted on Table III maintaining 1.5 volts AC (RMS) at J-103. Observe correct number of disappearances as noted in Table III. The proper number of disappearances must occur, as deviation control is rotated clockwise, to the +300 Kc. red line on deviation meter.

6.5 R. F. Output Meter Calibration

6.5.1 Repeat steps 6.4.1 to 6.4.8 under paragraph 6.4

6.5.2 Connect the Power Meter to the R. F. Output receptacle J-101 using an R. F. probe and adapter. Rotate the attenuator to 100,000 microvolts. Operate the Power Meter controls as necessary to measure the R.F. Output Level from J-101.

6.5.3 With the attenuator dial positioned to 100,000 microvolts and the R.F. Output Meter needle aligned with the 100,000 microvolt carrier set mark, the indicated level on the Power Meter must be 100,000 microvolts ± 1 db. If not, adjust the attenuator dial to obtain 100,000 microvolts on the Power Meter and then adjust Potentiometer R-135 until the R. F. Output Meter needle is aligned with the 100,000 microvolts carrier set mark.

6.6 Lubrication

6.6.1 The only parts of the subject equipment that require lubrication are the attenuator assembly AT-301 gears and shaft, and the OUTPUT TUNING shaft. Both shafts should be lubricated with graphite-petroleum compound, Specification MIL-C-5544, at the points where the shafts pass through the front panel. The AT-301 gears should be lubricated with grease, Specification MIL-G-3278. Apply a thin film of grease to all gear teeth and faces. Lubrication should be accomplished at 300 to 400 hour intervals or at overhaul.

TABLE I

TEST POINT VOLTAGES

LINE VOLTAGE 115 VAC - FREQUENCY SELECTOR POSITION "8" (413 mc)

TEST POINT	R. F. SUB CHASSIS	
	NORMAL OPERATION	LOW VOLTAGE OPERATION
301	1.3	0.75
302	0.2	0.24
303	0.5	0.60
304	4.4	2.00
305	1.1	0.45

TEST POINT	EXCITER SUB CHASSIS	
	NORMAL OPERATION	LOW VOLTAGE OPERATION
201	1.4	1.4
202	1.8	1.9
203	2.1	2.4
204	1.4	1.6

TABLE II SPECIAL TEST EQUIPMENT REQUIRED FOR MAINTENANCE

Name	Manufacturer's or AN Type Designation	Alternate	Use
Frequency Meter	Gertsch Model FM-3	TS-323/UR	R.F. output frequency Monitoring
Frequency Meter	AN/USM-26		A.F. output frequency Monitoring
Receiver	AN/URM-28		Deviation Linearity Check
Panoramic Adapter	Panoramic Radio Products Model SA-3 Type T-3000		Deviation Linearity Check
Vacuum Tube Voltmeter	Hewlett-Packard Model 400C		A.F. output level Check
Tube Tester	Signal Corps Type I-177A or Hickok 540	TV-3C/U	Test of electron tubes
Multimeter	Simpson 260	TS-352/U	Voltage and resistance measurements
A.F. Oscillator	Hewlett-Packard Model 200C	TS-382A/U	Deviation Linearity Check
Power Meter	Hewlett-Packard Model 430 (C or D)		

TABLE III

Modulation Test for ± 300 Kc. Deviation

Audio Freq. cps.	Carrier Disappearances
78,288	1 (1st sideband disappearance)
54,348	2
34,666	3
25,440	4
20,092	5
16,601	6
14,142	7
12,319	8
10,911	9
9792	10
8882	11
8126	12
7489	13

TABLE IV

Frequency of R.F. Carrier in kilocycles

Freq. Position	Desired Freq.	Lower Limit - .01%	Upper Limit + .01%
1	406,000	405,959.4	406,040.6
2	407,000	406,959.3	407,040.7
3	408,000	407,959.2	408,040.8
4	409,000	408,959.1	409,040.9
5	410,000	409,959.0	410,041.0
6	411,000	410,958.9	411,041.1
7	412,000	411,958.8	412,041.2
8	413,000	412,958.7	413,041.3
9	414,000	413,958.6	414,041.4
10	415,000	414,958.5	415,041.5
11	416,000	415,958.4	416,041.6
12	417,000	416,958.3	417,041.7
13	418,000	417,958.2	418,041.8
14	419,000	418,958.1	419,041.9
15	420,000	419,958.0	420,042.0

TABLE V

Power Calibrations ± 1db

Desired Output	Lower Limit	Upper Limit
100,000 microvolts	89,130 microvolts	112,200 microvolts

R-F OUTPUT CHASSIS

R-F EXCITER CHASSIS

REVISIONS				
LTR.	DESCRIPTION	DATE	OPTION	APPR.
A	GENERAL REVISION	1-19-54		W.H.A.K.

S-301 15 POSITION ROTARY SWITCH ACTUATED BY FREQUENCY KNOB

Z-301 RF FILTER BOX

Y-301 THRU Y-315 SELECTED BY S-301

V-301 OSCILLATOR 6AH6

V-302 QUADRUPLER 12AT7

V-303 MIXER 12AT7

V-304 AMPLIFIER 6AN5

V-305 TRIPLER 12AT7

V-306 TRIPLER 12AT7

OUTPUT TUNING

RF OUTPUT

V-201 OSCILLATOR 6AU6

V-202 REACTANCE MODULATOR 6AH6

V-203 DOUBLER 12AT7

V-204 DOUBLER 12AT7

V-205 DOUBLER 12AT7

V-206 DOUBLER 12AT7

V-207 TRIPLER 12AT7

V-208 DOUBLER 12AT7

150 Mc.

P-202

J-201 P-201 A B C D E F

6.3V

T-101

V-111 RECTIFIER 5R4WGY

S-101 POWER

Z-102 F-101 3A

F-102 2A

J-105 AC INPUT MS 3102A-10SL-3P

J-101 REMOTE CONTROL MS3102A-22-14S

S-110 LOCAL-REMOTE

S-102 CARRIER

V-101 REGULATOR OA2

V-102 MODULATION AMPLIFIER 6AU6

V-103 OSCILLATOR 12AU7

V-104 OSCILLATOR 12AU7

V-105 OSCILLATOR 12AU7

V-106 AMPLIFIER CATHODE FOLLOWER 12AU7

MODULATION AMPLIFIER CATHODE FOLLOWER 12AU7

V-109 METER AMPLIFIER 6AU6

V-110 METER AMPLIFIER 12AU7

+28V.

S-103 EXT MODULATION

J-102 EXT A F IN UG-657/U

J-104 AF MONITOR UG-657/U

DEVIATION

M-101

CR-101

CR-102

NOTES

UNLESS OTHERWISE INDICATED:
ALL RESISTANCE VALUES IN OHMS
ALL CAPACITANCE VALUES IN MICRO-MICROFARADS
K - INDICATES THOUSANDS
M - INDICATES MILLIONS
UF - INDICATES MICROFARADS
MH - INDICATES MILLIHENRIES

NOTE: S-110 SHOWN IN LOCAL POSITION

PART DESCRIPTION	MATERIAL SIZE AND DESCRIPTION	MATERIAL SPECIFICATION	FINISH	NEXT ASSY.	FINAL ASSY.

TOLERANCES AND GENERAL NOTES (UNLESS OTHERWISE NOTED)

FRAC. ± 1/64 DEC. .XXX ± .005 ANG. ±

1. MACHINE FINISH √ 125 FIL-STD-10.
2. MACHINE DIA'S ON COMMON CENTER CONCENTRIC WITHIN .005 T.I.R.
3. MACHINED SURFACES SQUARE TO RESPECTIVE AXIS WITHIN .002 PER IN.
4. MACHINED FILLETS .010 MAX.
5. DIMENSIONS TO BE MET BEFORE PLATING.
6. REMOVE BURRS AND BREAK SHARP EDGES.

SIGNATURES	NAME	DATE
DRAWN		
CHECKED		
ENGR.		
CH. DEPTM.		
APPROVED		

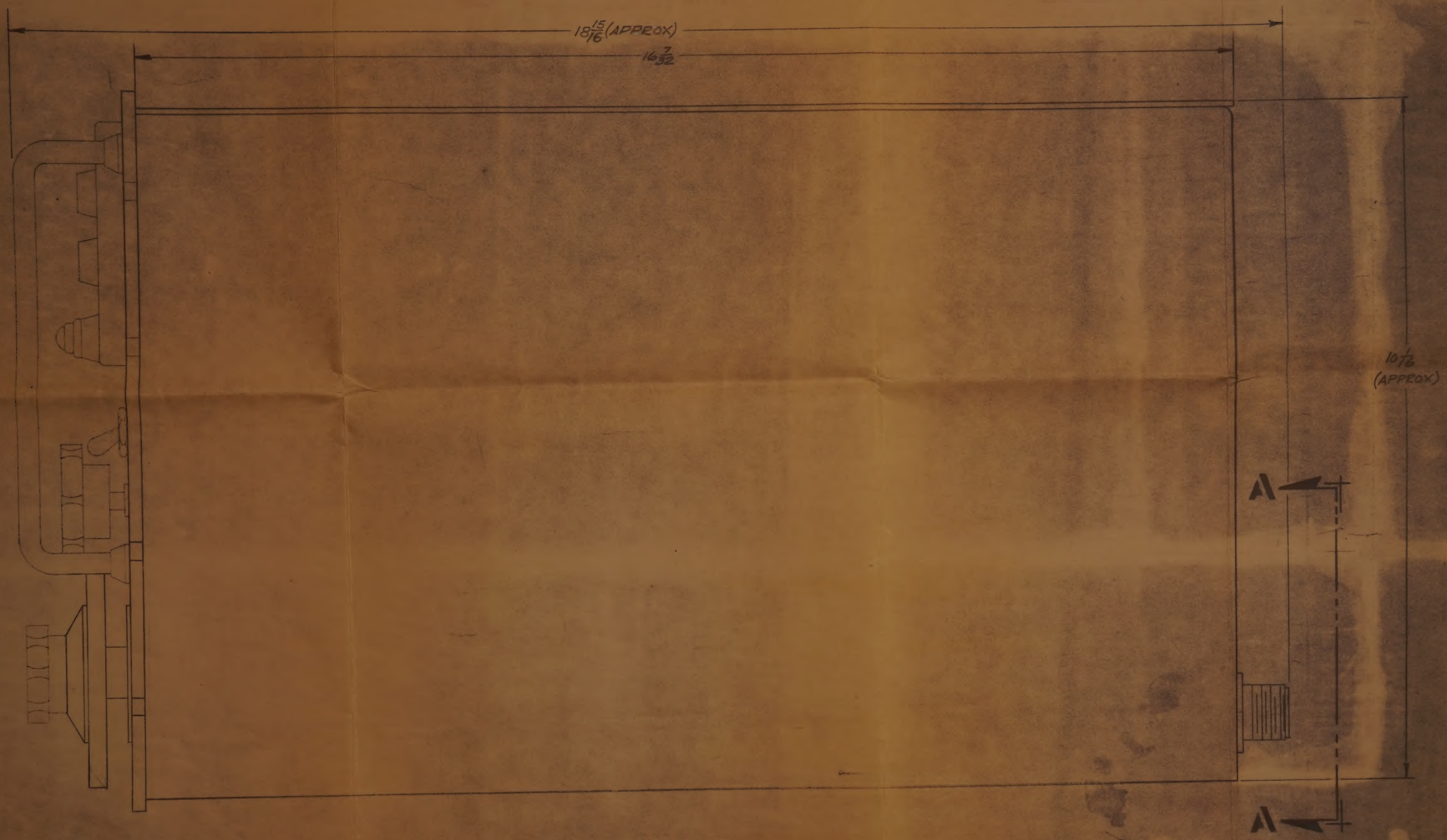
SCALE	HEAT TREATMENT	WEIGHT

TITLE: SCHEMATIC DIAGRAM BSG-11

Babcock RADIO ENGINEERING, INC. MT. MUGU, CALIFORNIA

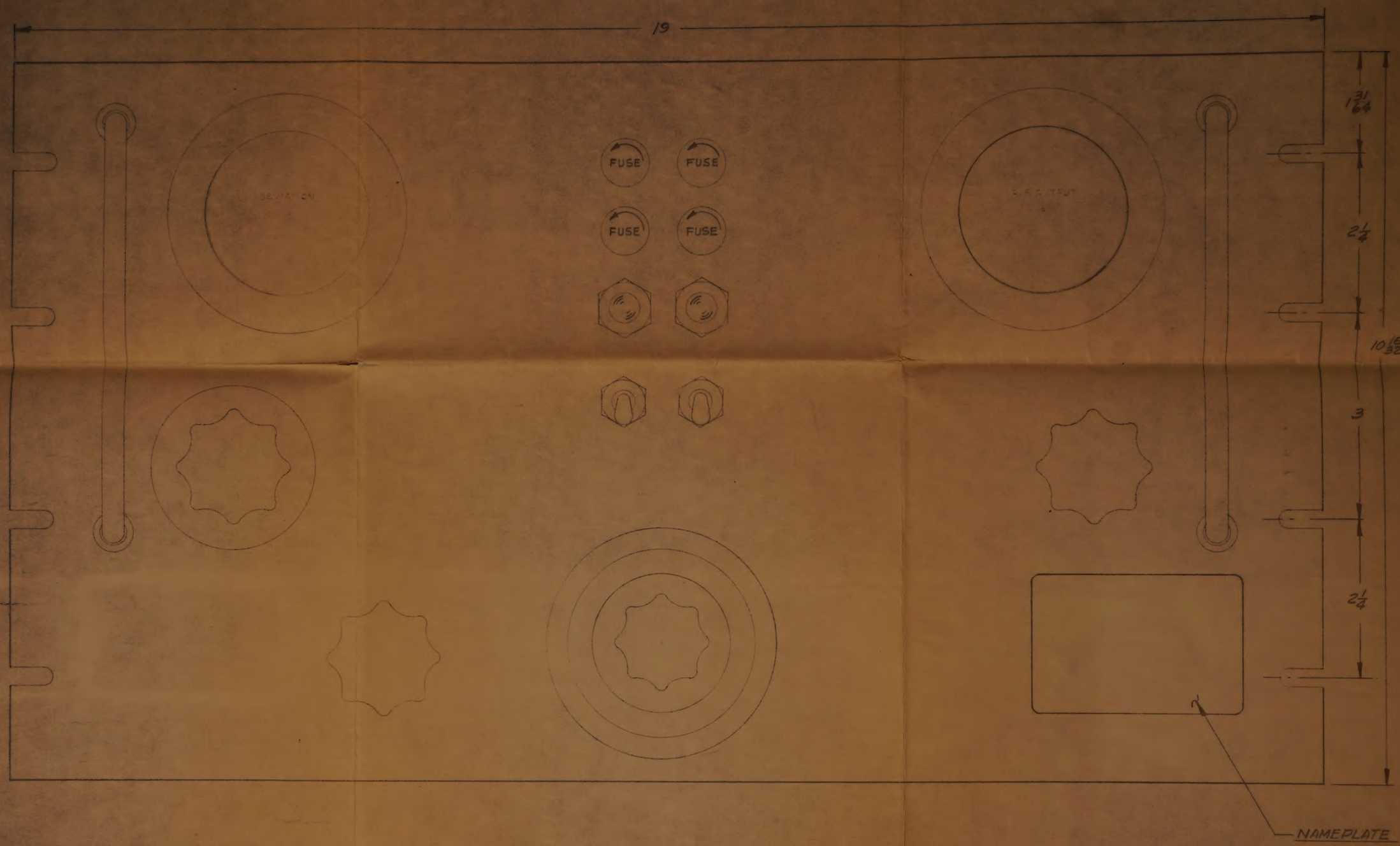
PART NO. 4042

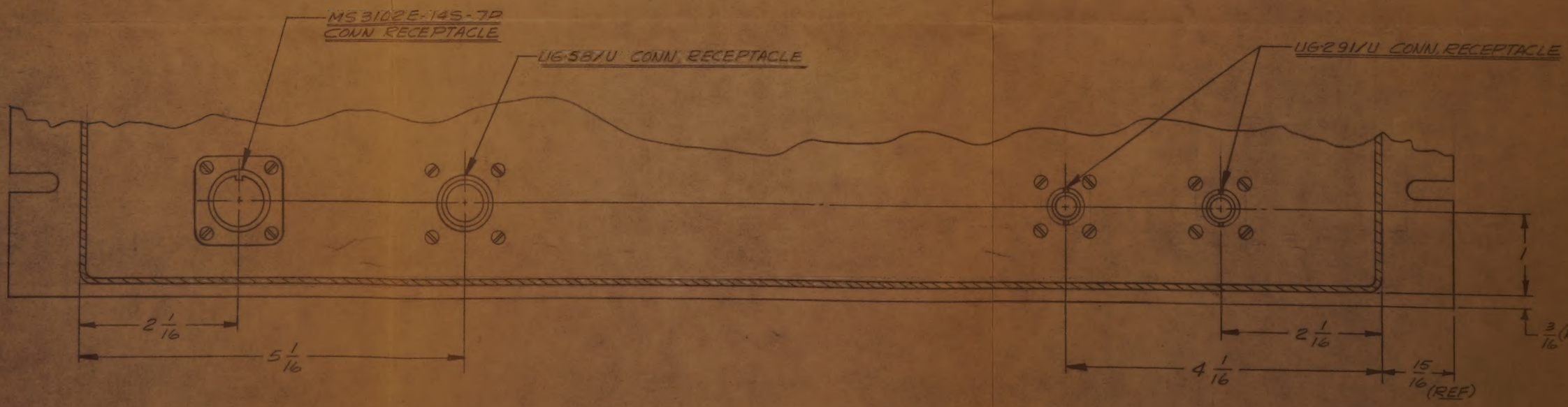
4042-1A



POWER REQUIREMENT: 115 V @ 50 TO 1000 CYCLES
WEIGHT: APPROX 70 LBS

3075





PARTIAL REAR VIEW A-A

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